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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,469	03/26/2007	Rodney James Dry	T2211-11786US01	5189
181 7590 12/03/2009 MILES & STOCKBRIDGE PC 1751 PINNACLE DRIVE SUITE 500 MCLEAN, VA 22102-3833				
EXAMINER				
MC GUTHRY BANKS, TIMA MICHELE				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
12/03/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipdocketing@milestockbridge.com  
sstiles@milestockbridge.com

### Office Action Summary

**Application No.**

10/587,469

**Applicant(s)**

DRY ET AL.

**Examiner**

TIMA M. MCGUTHRY-BANKS

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-16, 19-22, 24-30 and 33-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 38 and 39 is/are allowed.
- 6) ☒ Claim(s) 1-16, 19-22, 24-27 and 33-37 is/are rejected.
- 7) ☒ Claim(s) 28-30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

Claims 1, 10, 12, 19-21, 24, 33, 34 and 38 are currently amended, Claims 2-4, 13, 22 and 25 are as originally filed, Claims 5-9, 11, 14-16, 26-30 and 35-39 are as previously presented, Claims 17, 18, 23, 31 and 32 are cancelled and Claim 39 is new.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

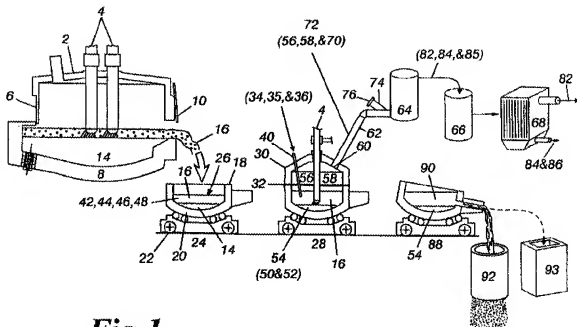
Claims 1-16 and 19-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites using solids injection lances and causing streams of molten iron and slag to be projected above the surface of the molten bath. Applicant incorporates by reference WO 96/31627, but this reference does not include lances and streams.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-13, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy (US 6,438,154 B2) in view of Innes et al (US 6,083,296).

Vallomy teaches a method for recovering metal values from liquid slag from a steelmaking furnace as shown below in Fig. 1:



**Fig.1**

Steelmaking slag 16 from the EAF 6 is added to molten metal 14 in vessel 18. The molten metal contains iron (column 2, line 63). SiO<sub>2</sub> is introduced into the molten slag (line 42). Carbon, baghouse dust and inert gas are inserted in the vessel via a lance (column 5, lines 42-44). Metallic oxides are reduced (column 5, line 30). Regarding the limitation that the slag forming agent directly as opposed to pre-treating, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the heated SiO<sub>2</sub> added to the vessel reads on the claimed invention, since applicant does not claim what the pre-treating steps entail. However,

Vallomy does not teach injecting with sufficient momentum to penetrate the molten bath as in Claim 1.

Innes et al teaches producing metals and metal alloys characterized by injecting a carrier gas and solid carbonaceous material and/or metal oxides into the molten bath. The solids penetrate the molten bath and cause molten metal to be projected into the gas space (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to inject the solids of Vallomy to cause the penetration as taught by Innes et al, since Innes et al teaches that the reactions in metallurgical reaction vessels are increased if fractions of the smelt are ejected from the bath like a fountain through the amount of gas introduced via the under-bath tuyeres and these fractions of the smelt move within the gas space in the form of drops, splashes and large particles of the smelt on ballistic trajectories that are only stopped when the smelt fractions hit the vessel wall or the smelt itself, collide with other smelt fractions or are drawn in by the oxidizing gases blown onto the bath in the form of free jets (column 1, lines 57-67).

Regarding Claims 2-4, Vallomy reads on using all of the steelmaking slag. Regarding Claims 5 and 19, the steelmaking slag is 84% (Example 1) and 83% (Example 2) of the total flux units. Regarding Claim 6, Vallomy teaches granulating or molding the molten iron (column 5, lines 40-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made that Vallomy reads on supplying molten iron, since applicant does not provide any operating conditions. Regarding Claim 7, the produced iron can be used in steel foundries (column 8, lines 45-47). Regarding Claim 8, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the iron produced by Vallomy with iron produced in at least one other steelmaking vessel to optimize production. Regarding

Claim 9, the P content in the molten iron is low (16 ppm and 39 ppm), which reads on partitioning P to the slag. Regarding Claim 10, Innes et al teaches injecting into the bath. Regarding Claim 11, the steelmaking slag is heated. Regarding Claims 12 and 13, the slag is 1300 C (column 4, line 42).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy in view of Innes et al as applied to claim 1 above, and further in view of Dimitrov et al (US 6,241,798 B1).

Vallomy in view of Innes et al discloses the invention substantially as claimed. However, Vallomy teaches using  $\text{SiO}_2$ . Dimitrov et al teaches an iron smelting process using slag formers such as lime and sand (column 7, lines 23 and 24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute lime for  $\text{SiO}_2$  in Vallomy in view of Innes et al, since Dimitrov et al teaches that lime and  $\text{SiO}_2$  are functionally equivalent.

Claims 24-27, 33 and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy.

Vallomy is applied as discussed above. Regarding Claim 37, it would have been obvious to one of ordinary skill in the art at the time the invention was made to expect that the amount of FeO could be at least 3%, since Vallomy teaches a temperature of 1400-1450 C (column 5, line 31).

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy as applied to claim 24 above, and further in view of Dimitrov et al.

Vallomy in view of Dimitrov et al is applied as discussed above.

***Allowable Subject Matter***

Claims 38 and 39 are allowed.

Claims 28-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 14-16, 21 and 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Regarding Claims 14, 15, 21, 22, 28 and 29, Vallomy teaches maintaining the temperature of the steelmaking slag at 1300 C. There is no basis to suggest a temperature less than 1050 C or cooling. Regarding Claims 16 and 30, Vallomy does not teach using wet sludge containing steelmaking slag. Regarding Claim 38, Vallomy does not teach or suggest using iron ore. Regarding Claim 39, Vallomy does not teach pre-treating the slag by at least partially reducing the slag.

***Response to Arguments***

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMA M. MCGUTHRY-BANKS whose telephone number is (571)272-2744. The examiner can normally be reached on M-F 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/George Wyszomierski/  
Primary Examiner  
Art Unit 1793

/T. M. M./  
Examiner, Art Unit 1793  
2 December 2009